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(71) Applicant(s)

Dixon International Limited

(Incorporated in the United Kingdom)

Pampisford, Cambridge CB2 4HG, United Kingdom

(72) Inventor(s)

Eric Southern

(74) Agent and/or Address for Service

Edward Evans & Co

Chancery House, 53-64 Chancery Lane, LONDON,
WC2A 1SD, United Kingdom

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E06B 5/16

(52) UK CL (Edition O)

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(56) Documents Cited

GB 2287740 A GB 2247709 A GB 2232702 A

GB 2148993 A DE 004200484 A US 4660338 A

US 3955330 A

Palusol 100P intumescent fire seals, 1976, ref:
LP1004/SS, Lorient Polyproducts Ltd., Unit 5, Bittern
Industrial Units, Bittern Road, Sowton Industrial
Estate, Exeter, Devon, EX2 7LW.

(58) Field of Search

UK CL (Edition O) E1J JGM JGN JM

INT CL⁶ E06B 5/16 7/16 7/22 7/23

Online: World patents Index, EDOC, JAPIO.

(54) Seal with intumescent body and flexible smoke seal

(57) A smoke and fire seal 10, 20, 50, comprises a body 32 of intumescent material and a flexible smoke sealing member 34 in the form of a brush 38, 46 or blade 40, each of which is mounted on a base strip 36. The base strip is either held fast to the intumescent material by means of adhesive (figures 1-3) or retained within a channel formed by the body of intumescent material (figures 4 & 5). The seal does not need to comprise a holder to accommodate the body of intumescent material and to retain the smoke sealing member and the body of intumescent material and the smoke sealing member may be made within wide tolerances.

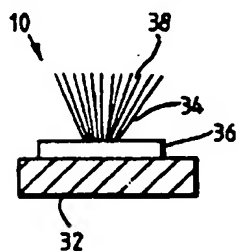


FIG. 1

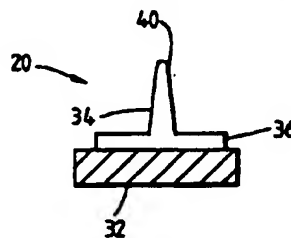


FIG. 2

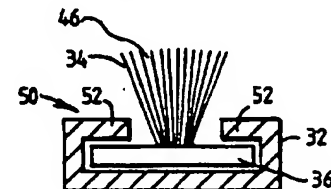


FIG. 5

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

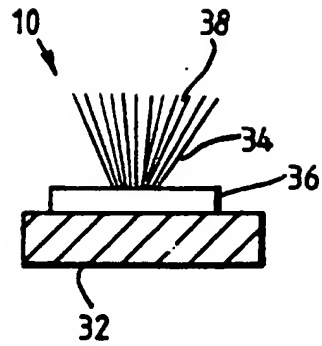


FIG. 1

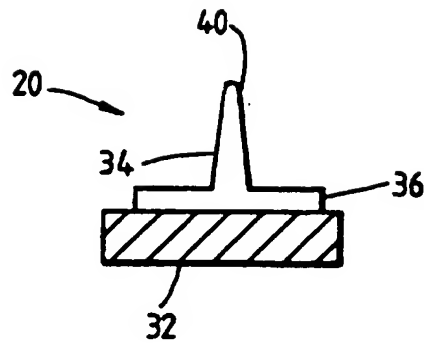


FIG. 2

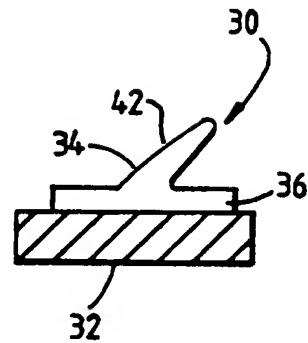


FIG. 3

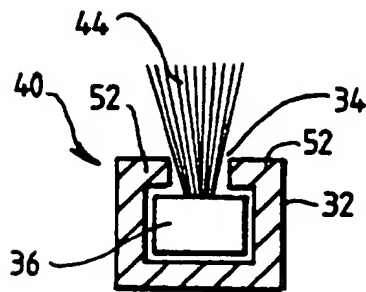


FIG. 4

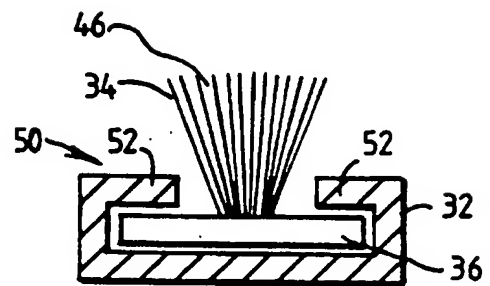


FIG. 5

SEAL

The present invention relates to a fire and smoke seal.

A known fire and smoke seal comprises a smoke sealing member having a flexible element such as a blade or brush to provide sealing against passage of cold smoke and intumescent material which when subjected to elevated temperature as in the event of a fire intumesces to provide sealing against hot gases. In such a known seal the smoke sealing member has a base which is retained by the holder, the flexible element protrudes from the holder and a body of intumescent material is retained in the holder. The holder, which may be of aluminium or PVC, is used to attach the seal to one of a pair of members between which sealing is to be provided. Such members may be a door or openable window and a surrounding fixed door or window frame or a pair of double doors.

Disadvantages of such seals are:

The seals have three components which have to be made within prescribed, narrow tolerances;

In manufacture of the seals the flexible element and the body of intumescent material have to be slid into the holder and this restricts the length of seals which can conveniently be made and is an expensive procedure.

The holder delays the heating and accordingly the onset of intumescence of the intumescent material. In particular, where the holder is of aluminium, the thermal heat capacity of the aluminium delays the heating of the intumescent material and, where the holder is of PVC the thermally insulating nature of the PVC delays the heating of the intumescent material.

The degradation products of PVC are environmentally unfriendly and aluminium is demanding in energy to manufacture.

The present invention aims, at least in preferred embodiments, to overcome or mitigate such disadvantages and to provide fire and smoke seals which can be made at lower cost.

In accordance with the present invention there is provided a smoke and fire seal comprising a body of intumescent material and a smoke sealing member having a flexible smoke sealing element, the smoke sealing member being held fast to or otherwise retained by the body of intumescent material.

The flexible element may be a brush or pile element or a rubber or flexible thermoplastic blade.

The smoke sealing member may be bonded to the body of intumescent material by adhesive or by using heat (but without exceeding the activation temperature of the intumescent material) to fuse or seal the member to the intumescent material. Alternatively the intumescent material may be in the form of a channel in which the smoke sealing member is retained. The smoke sealing member may or may not be bonded to the intumescent material forming the channel.

If the smoke sealing member is bonded to the body of intumescent material by using heat, then clearly the softening points of the material (e.g. polymer) of the smoke sealing member and of the binder of the intumescent material must be below the activation temperature of the intumescent material.

The intumescent material may comprise intumescent graphite to provide intumescence.

Preferably the seal is elongate and of uniform cross-section, both the smoke sealing member and the body of intumescent material being elongate and of uniform cross-section.

It will be appreciated that the seal in accordance with the present invention does not need to comprise a holder to accommodate the body of intumescent material and to retain the smoke sealing member and the body of intumescent material and the smoke sealing member may be made within wide tolerances.

The invention is further described below by way of example with reference to the accompanying drawings wherein:

Figures 1 to 5 are each a cross section of a fire and smoke edge seal.

Referring to the drawings, Figure 1 shows a seal 10, Figure 2 shows a seal 20, Figure 3 shows a seal 30, Figure 4 shows a seal 40 and Figure 5 shows a seal 50.

The seals 10, 20, 30, 40 and 50 are each of elongate and of uniform cross-section.

Each seal 10, 20, 30, 40 and 50 comprises an elongate body 32 of intumescent material, the body being of uniform cross-section along its length.

The body 32 of the seals 10, 20 and 30 is of rectangular cross-section. The body 32 of the seals 40 and 50 is in a form of a holder with inturned lips 52 at the mouth of the channel.

Each seal also comprises a smoke sealing member 34. The smoke sealing member 34 of each seal 10, 20 and 30 includes a base strip 36 which is held fast on the body of intumescent material 32. The smoke sealing member 34 of the seals 40 and 50 includes a base 36 retained in the channel 32 by the inturned lips 52.

The base 36 of the smoke sealing member 34 of the seal 40 is of approximately square cross-section and the base 36 of the smoke sealing member 34 of the seal 50 is in the form of a strip of rectangular cross-section.

The smoke sealing member 34 of the seal 10 includes a smoke sealing element in the form of a brush 38 protruding from the base strip 36.

The smoke sealing member 34 of the seal 20 includes a smoke sealing element in the form of a flexible blade 40 integrally formed with the base 36.

The smoke sealing member 34 of the seal 30 includes a smoke sealing element in the form of a flexible blade 42 integrally formed with the base 36.

The smoke sealing member 34 of each seal 40 and 50 includes a brush 44 or 46 protruding from the base 36 through the mouth of the channel 32.

In the seal 20 the blade 40 is perpendicular to the base 36. In the seal 30 the blade 42 is at an acute angle to the base 36.

The brushes 44 and 46 could be replaced by flexible blades.

The seal 20 is suitable for use on e.g. the meeting stiles of double-acting double doors or a stile of a double acting single door. The seal 30 is more suitable for use on a single-acting door. The other seals 10, 40 and 50 are suitable for use both on double-acting and single-acting doors.

The base 36 of each smoke sealing member of the seals 10, 20 and 30 may be attached to the body 32 of intumescent material by adhesive or may be fused thereto by heating. Similarly the base 36 of the smoke sealing members 34 of the seals 40 and 50 may be held fast within the channel 32 by adhesive or by being fused thereto by heating or may be simply retained in the channel by the intumed lips 52.

The intumescent material may comprise graphite to provide intumescence.

In use of the seals, the body 32 of intumescent material is attached directly to one of a pair of co-operating members e.g. by adhesive without the use of a holder accommodating the intumescent material. The seal may be secured to a surface of the member to which it is attached or located in the groove in the member.

The pair of members may be a door or movable window and a door or window frame or a pair of double doors.

The smoke sealing element provides sealing against draughts and cold smoke e.g. where the door or window cooperates with a fixed door or window frame, when the door or window is closed or, where the cooperating members are a pair of double doors, when the doors are closed. In the event of a fire the

intumescent material intumesces when subjected to the heat of the fire to provide sealing against flame and other hot gases.

CLAIMS

1. A smoke and fire seal comprising a body of intumescent material and a smoke sealing member having a flexible smoke sealing element, the smoke sealing member being held fast to or retained by the body of intumescent material.
2. A seal according to claim 1, wherein the flexible element is a brush or pile element or a rubber or flexible thermoplastic blade.
3. A seal according to either of claims 1 and 2, wherein the smoke sealing member is bonded to the body of intumescent material by adhesive or by using heat (but without exceeding the activation temperature of the intumescent material) to fuse or seal the member to the intumescent material.
4. A seal according to claim 1 or 2, wherein the intumescent material is in the form of a channel in which the smoke sealing member is retained.
5. A seal according to any preceding claim, wherein the intumescent material comprises intumescent graphite to provide intumescence.
6. A seal according to any preceding claim, wherein both the smoke sealing member and the body of intumescent material are elongate and of uniform cross-section.
7. A seal according to any preceding claim and which does not comprise a holder to accommodate the body of intumescent material and to retain the smoke sealing member and the body of intumescent material.

8. A smoke and fire seal substantially as herein described with reference to and as illustrated in any of Figures 1 to 5 of the accompanying drawings.



The
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Application No: GB 9701802.2
Claims searched: 1-8

Examiner: John Rowlatt
Date of search: 5 March 1997

Patents Act 1977 Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): E1J: JGM, JGN, JM.

Int Cl (Ed.6): E06B: 5/16, 7/16, 7/22, 7/23.

Other: Online: World Patents Index, EDOC, JAPIO.

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB2287740A (ENVIRONMENTAL SEALS LTD.) - see figure 3, intumescent material 6 and smoke seal 5.	1, 2 & 5-7
X	GB2247709A (ACCENT GROUP LIMITED) - see figure 6, intumescent material 36 and smoke seal 37.	1, 2 & 5-7
X	GB2232702A (ENVIRONMENTAL SEALS LTD.) - see figure 2, intumescent (graphite) material 4 and smoke seal 2, 3.	1-3 & 5-7
X	GB2148993A (MANN MCGOWAN FABRICATIONS LIMITED) - see figure 1, intumescent material 32 and smoke seal 34.	1, 2, 5 & 6
X	US4660338A (WAGNER) - see figure 2, intumescent material 10 and smoke seal 4.	1-3 & 5-7
X	US3955330A (WENDT) - see figure 2, intumescent material 18 and smoke seal 16.	1, 2, 5 & 6
X	DE4200484A (FLAM-X) - see figure 1, intumescent body 6 and smoke seal 6.	1, 2 & 5-7

X Document indicating lack of novelty or inventive step
Y Document indicating lack of inventive step if combined with one or more other documents of same category.

& Member of the same patent family

A Document indicating technological background and/or state of the art.
P Document published on or after the declared priority date but before the filing date of this invention.
E Patent document published on or after, but with priority date earlier than, the filing date of this application.



The
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Application No: GB 9701802.2
Claims searched: 1-8

Examiner: John Rowlatt
Date of search: 5 March 1997

Category	Identity of document and relevant passage	Relevant to claims
X	Palusol 100P intumescent fire seals 1976, reference LP1004/SS, Lorient Polyproducts Ltd., Unit 5, Bittern Industrial Units, Bittern Road, Sowton Industrial Estate, Exeter, Devon, EX2 7LW.	1, 2 5 & 6

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

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